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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/714,001	11/14/2003	Tzu-Ching Tsai	10113201	1528

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QUINTERO LAW OFFICE
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EXAMINER

PHAM, THANHHA S

ART UNIT PAPER NUMBER

2813

DATE MAILED: 03/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/714,001

Applicant(s)

TSAI ET AL.

Examiner

Thanhha Pham

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 November 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 12-17 and 20 is/are allowed.
- 6) ☐ Claim(s) 1, 5-8, 10, 11, 18 and 19 is/are rejected.
- 7) ☒ Claim(s) 2-4 and 9 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Oath/Declaration

1. Oath/Declaration filed on 11/14/2004 has been considered.

Claim Objections

2. Claims 18 and 19 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claims 18 and 19 fail to further limit the subject matter claim 11 because the claim 11 includes limitation of wherein the conductive layer is doped polycrystalline silicon doped with As. Appropriate correction is needed.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1 and 5-7 are rejected under 35 U.S.C. 102(e) as being anticipated by Amo et al. [US 6,690,053].

► With respect to claim 1, Amo et al. (figs.1-5, cols. 5-8) discloses a method of forming a bit line contact via, comprising:

providing a substrate (1, fig. 2, col. 6 lines 6-17) with a transistor thereon, the transistor having a gate electrode (7), drain region (12), and source region (12);

forming a conductive layer (19, fig. 4, col. 8 lines 1-3) overlying the drain region (12);

conformally forming an insulating barrier layer (28, fig. 4, col. 8 lines 7-10) overlying the substrate (1);

blanketly forming a dielectric layer (29, fig. 4, col. 8 lines 11-14) overlying the insulating barrier layer (28); and

forming a via (42, fig. 5, col. 8 lines 24-44) through the dielectric layer (29) and the insulating barrier layer (28), exposing the conductive layer (19).

► With respect to claim 5, Amo et al. (fig.4, col. 8 lines 1-3) discloses that the conductive layer (19) is doped polycrystalline silicon.

► With respect to claim 6, Amo et al. (fig.4, col. 8 lines 8-9) discloses that the insulating barrier layer (28) comprises SiN.

► With respect to claim 7, Amo et al. (fig.4, col. 8 lines 11-12) discloses that the dielectric layer (29) comprises an oxide.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Amo et al. [US 6,690,053] in view of Koubuchi et al. [US 6,664,642].

Amo et al. substantially disclose the claimed method except teaching that the dielectric layer comprises boro-phosphosilicate glass (BPSG). However, Koubuchi et al. discloses that the dielectric layer (36) can be a silicon oxide or BPSG (fig. 19, col. 20 lines 34-48). Therefore, it would have been obvious to one of ordinary skill in the art at to select either silicon oxide or BPSG for the dielectric layer in the Amo et al because, as taught by Koubuchi et al., such materials are equivalence for their use in the semiconductor art as the insulating dielectric materials (see col. 20, lines 46-48). Moreover, selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in *Sinclair & Carroll Co., Inc. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945).

5. Claims 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Amo et al. [US 6,690,053] in view of Saito et al. [US 6,399,438].

Amo et al. substantially discloses the claimed method except teaching that the polycrystalline silicon is doped with As. However, Saito et al. discloses that the polysilicon (21) is doped with As (col. 16 lines 53-56). Therefore, at the time of invention, it would have obvious for those skilled in the art to modify process of Amo et

al. by using polycrystalline silicon doped with As in the conductive layer as taught by Saito et al. to increase the conductivity of the conductive layer.

Allowable Subject Matter

6. Claims 12-17 and 20 are allowed.

7. Claims 2-4 and 9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. The following is a statement of reasons for the indication of allowable subject matter:

► Recorded Prior Art fails to disclose the combination of the process steps of forming a bit line contact via as cited in the base claims 12 and 20 including: removing the unwanted conductive layer and doped polycrystalline silicon layer, leaving the doped polycrystalline layer thinner than the gate electrode, overlying the drain region, and the conductive layer covered by the doped polycrystalline silicon layer; conformally forming an insulating barrier layer overlying the substrate; blanketly forming a dielectric layer overlying the insulating barrier layer; and forming a via through the dielectric layer and insulating barrier layer, exposing the doped polycrystalline silicon layer.

► Recorded Prior Art fails to disclose the combination of the process steps of forming a bit line contact via as cited in the base claim 1 wherein forming the conductive layer further comprising: blanketly forming the conductive layer over the substrate; removing the unwanted conductive layer, leaving the conductive layer thinner than the

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gate electrode, overlying the drain region and source region; forming a patterned resist layer exposing the conductive layer overlying the source region; removing the exposed conductive layer using the patterned resist layer as a mask; and removing the patterned resist layer, and the conductive layer covered by the doped polycrystalline silicon layer; conformally forming an insulating barrier layer overlying the substrate; blanketly forming a dielectric layer overlying the insulating barrier layer; and forming a via through the dielectric layer and insulating barrier layer, exposing the doped polycrystalline silicon layer as characteristics cited in claims 2, 3 or 4.

Conclusion

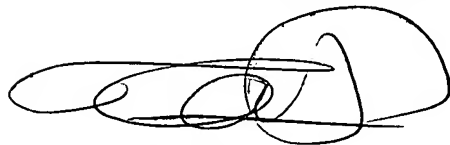
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanhha Pham whose telephone number is (571) 272-1696. The examiner can normally be reached on Monday and Thursday 9:00AM - 9:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

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you have questions on access to the Private PAIR system, contact the Electronic
Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, consisting of several overlapping loops and a final horizontal stroke.

Thanhha Pham
Patent Examiner
Patent Examining Group 2800